

1    **CLAIMS**

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- 3    1. A tool for circulating fluid in a well bore, the tool  
4       comprising a tubular assembly having a through  
5       passage between an inlet and a first outlet, the  
6       inlet and first outlet being adapted for connection  
7       in a work string, a second outlet extending generally  
8       transversely of the tubular assembly; an obturating  
9       member moveable between a first position closing the  
10       second outlet and a second position permitting fluid  
11       flow through the second outlet, the obturating member  
12       including restraining means to actively retain the  
13       obturating member independently in the first and the  
14       second positions; an engagement mechanism actuatable  
15       between an engaged configuration, in which the  
16       obturating member is locked in one of the first or  
17       second positions; and a disengaged configuration in  
18       which the obturating member can move to the other of  
19       the first and second positions; a fluid pressure  
20       actuation surface coupled to the engagement mechanism  
21       and biased by a spring located between the tubular  
22       assembly and the engagement mechanism; wherein  
23       variation of fluid pressure on the actuation surface  
24       controls actuation of the engagement mechanism and  
25       stroking the tool in the disengaged configuration  
26       moves the obturating member.
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- 28    2. A tool as claimed in Claim 1 wherein the obturating  
29       member comprises a sleeve axially slidable within the  
30       tubular assembly.
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- 32    3. A tool as claimed in Claim 1 or Claim 2 wherein the  
33       restraining means is a collet.

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4. A tool as claimed in Claim 3 wherein the collet is retainable in a plurality of recesses on the tubular assembly.
5. A tool as claimed in any one of the previous claims wherein the fluid pressure actuation surface is located on an actuator sleeve axially slidable within the tubular assembly.
6. A tool as claimed in Claim 5 wherein a portion of the actuator sleeve is located across the collet.
7. A tool as claimed in any one of the previous claims wherein the engagement mechanism comprises mutually engageable formations on each of the actuator sleeve and the tubular assembly.
8. A tool as claimed in Claim 7 wherein the formations comprise a pin and a groove.
9. A tool as claimed in Claim 8 wherein the groove is continuous so that the pin can travel in a continuous cycle around the groove.
10. A tool as claimed in Claim 9 wherein the groove comprises a plurality of apexes and bases such that the pin moves longitudinally to the tubular assembly, for at least a portion of the cycle.
11. A tool as claimed in any one of the previous claims wherein the second outlet comprises a plurality of

1 ports in the tubular assembly which communicate with  
2 the inlet.

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4 12. A tool as claimed in Claim 11 wherein the ports are  
5 distributed circumferentially around the outer  
6 surface of the tubular assembly.

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8 13. A tool as claimed in any one of the previous claims  
9 wherein the cross-sectional area of the first outlet  
10 is greater than the cross-sectional area of the  
11 second outlet.

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13 14. A method for circulating fluid in a well bore, the  
14 method comprising the steps:

15 (a) inserting a work string into the well bore, the  
16 work string having a fluid inlet, a first fluid  
17 outlet and a second fluid outlet, an obturating  
18 member which is moveable between a first and  
19 second position to respectively close and open  
20 the second fluid outlet, and an engagement  
21 mechanism which when engaged locks the  
22 obturating member in one of the first or second  
23 positions;

24 (b) varying the fluid pressure through the work  
25 string to move the engagement mechanism between  
26 locked and unlocked configurations; and

27 (c) stroking the work string to move the obturating  
28 member between the first and second positions.

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30 15. A method as claimed in Claim 14 wherein varying the  
31 fluid pressure through the work string is achieved by  
32 pumping fluid through the work string.

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1 16. A method as claimed in Claim 15 wherein the method  
2 includes the step of running the work string in a  
3 closed and locked configuration with the pumps turned  
4 off.

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6 17. A method as claimed in Claim 15 or Claim 16 wherein  
7 the method includes the step of drilling with the  
8 work string in a closed and locked configuration and  
9 in compression while pumping fluid.

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11 18. A method as claimed in Claims 15 to 17 wherein the  
12 method includes the step of back reaming with the  
13 work string in a closed and unlocked configuration  
14 and in tension while pumping fluid.

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16 19. A method as claimed in Claims 15 to 18 wherein the  
17 method includes the step of opening the second outlet  
18 with the work string in tension with the pumps off.

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20 20. A method as claimed in Claims 15 to 19 wherein the  
21 method includes the step of stroking the work string  
22 in a locked and open configuration while pumping  
23 fluid.

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25 21. A method as claimed in Claims 15 to 20 wherein the  
26 method includes the step of stroking the work string  
27 in a locked and open configuration with the pumps  
28 off.

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30 22. A method as claimed in any one of Claims 14 to 21  
31 wherein the method includes operating the work string  
32 in a cyclic manner through the following  
33 configurations:

- 1 (a) locked closed;
- 2 (b) unlocked closed;
- 3 (c) unlocked open;
- 4 (d) locked open;
- 5 (e) unlocked open; and
- 6 (f) unlocked closed.